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Ship's force overhaul management system: an evaluation of its effects on shipboard authority.

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NAVAL POSTGRADUATE SCHOOL
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THESIS

SHIP'S FORCE OVERHAUL MANAGEMENT SYSTEM:
AN EVALUATION OF ITS EFFECTS
ON SHIPBOARD AUTHORITY

by

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October 1982

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Ship's Force Overhaul Management System: An Evaluation of Its Effects on Shipboard Authority

by

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Submitted in partial fulfillment of the
requirements for the degree of

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October 1982

ABSTRACT

The Ship's Force Overhaul Management System (SFOMS) is a management control system used on board U. S. Navy ships in overhaul. SFOMS is just one of the many components of the entire shipboard management system, and in order to be effective, SFOMS must balance, support, or complement all of the other system components. This research identified SFOMS' effect on the shipboard authority structures of a destroyer in overhaul and the resultant effect on SFOMS usage. SFOMS did increase the authority of upper level managers by providing them with a wider range of access to work information. This caused some lower level supervisors to adjust SFOMS information to prevent their seniors from exercising greater control over them.

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QUESTION: "Today, do you think SFOMS is useful to the work centers that receive the SFOMS reports?"

ANSWER: "No. They do not understand SFOMS as a management tool, because we only use it when we go into overhaul. You don't do that to a man, not a guy down on the deckplates. You give a man a job, you teach him how to do that job, and you be consistent with him. For God's sake, when I inspect a space I don't change my rules every time I go into it. I'd expect to be shot if I did that. So, what do we do? We expect them to be the framework of management for maintenance and repair of a ship. We train them under an operational environment to do one thing. That is: keep the ship moving, and keep people informed. . .there should be one way for a man to communicate a problem, the form his corrective action will take, and one way to say that it's done.

Then we come into overhaul. Approximately one year before we start the overhaul, we start training our people about SFOMS. SFOMS is not the way we do business outside of the shipyard. Is there a problem starting already in this little discussion? You bet there is! I am now going to tell a man who has been doing something, doing it very well, that it's not going to work during overhaul. You've got to change your ways. He resents that. He's a proud individual. He knows that he can manage anything in his space. He's wrong of course. You and I know that, but he doesn't know that. He's not going to admit it. . .you embarrass that man by saying that his way of doing business is no longer good enough. He has to be a very special kind of person to accept that kind of redirection.

Why are we still convincing our sailors how good SFOMS is? It's because it isn't good. To them it is not good. If it was good it would sell itself. . .are they good enough to understand it? Yes. Am I going to spend my time making them SFOMS experts? Of necessity, I have to for a certain amount of time."

QUESTION: "What should have happened that didn't happen to have made the SFOMS training better?"

ANSWER: "Oh, use SFOMS year round, every year, wherever you are. Why not?"

A transcript of an interview with a SFOMS user. Spring, 1982.

I. INTRODUCTION

> Provided further, that not less than $3,745,700,000 of this appropriation shall be available only for regularly scheduled ship overhauls, restricted availabilities and expenses associated with the installation of equipment, improvements, and modifications scheduled to be accomplished concurrently during an overhaul or restricted availability.
>
> Appropriation for Operation and Maintenance, Navy
> Budget of the United States Government,
> Fiscal Year 1982

The overhaul of a United States Navy ship is an expensive evolution. During Fiscal Year 1982, the Navy will spend over three and one half billion dollars on the repair, renovation, and upgrade of the engineering plants, weapons systems, and habitability spaces of ships throughout the Atlantic and Pacific Fleets. For instance, the average cost of a ten month overhaul for a typical twenty year old destroyer is thirty million dollars (Long Beach Naval Shipyard, 1982). The thirty million dollars only includes the costs associated with repairs performed by shipyard personnel. The cost does not include the value of resources used by the crew to perform ship's force repairs. According to the Surface Naval Forces, Pacific Fleet comptroller, the commanding officer of a destroyer type combatant about to enter overhaul can expect his annual operating target (OPTAR) funding to increase by at least $170,000 to $250,000, depending on the size and age of his vessel. This

augmentation could more than double the amount of a ship's annual OPTAR. (Comptroller, 1982) Also, the thirty million dollars does not include the cost of salaries and allowances to support the officers and sailors assigned to the ship in overhaul. The salaries and benefits of the crew could easily exceed three million dollars for a crew of two hundred and fifty men (NAVCOMPTNOTE, 1982). The value of the crew greatly increases as one considers the direct influence the officers and enlisted men bear on the shipyard and consequent shipyard performed work. It is the crew which plays the most important part in the overhaul. They are the ones who must accept the final product, a ship able to get underway and meet all of its operational requirements. The crew must be qualified to capably monitor and evaluate all shipyard conducted repairs. They must also be able to identify that work which is critical to the ship's missions, but not accepted for shipyard accomplishment, and efficiently and effectively accomplish it.

A. PROBLEMS ENCOUNTERED DURING OVERHAUL

During the mid-1960's, the Chief of Naval Operations (CNO) determined that, in many instances, Navy ships were not receiving effective overhauls. This was attributed to the crew's inability to effectively and efficiently plan and control ship's force work. Once in overhaul, crews soon learned they could not manage their work as they did when

their ships were operational. In overhaul, work center supervisors seldom planned work for more than a couple of weeks at best. On the other hand, the shipyard supervisors were experts at long range planning and programming using time studies, program evaluation and review techniques (PERT) charts, and the critical path method (CPM). Shipyard performed work was generally extremely well planned and scheduled to the day for the entire overhaul period. It was within that meticulously planned and highly developed management control framework that a ship's crew in overhaul was expected to plan, schedule, perform, and evaluate their own work. According to the CNO, too many crews in a shipyard environment lacked the necessary techniques to effectively and efficiently control their own work. (Carr, 1982; Morris, 1982; and Moen, 1982) In other words, they were unable to capably exercise management control. Management control can be defined as "the process by which management assures that the organization carries out it's strategies effectively and efficiently," (Anthony and Herzlinger, p. 3, 1982).

Top Navy leadership believed if a formal framework existed for a crew to develop, schedule, and evaluate their work for the entire overhaul period, the many problems witnessed in overhaul could be eliminated (Carr, 1982).

B. IN SEARCH OF A SOLUTION

Naval Sea Systems Command (NAVSEA) in Washington, D. C. was tasked to develop a management control framework for

ship's force use while in overhaul. In the late 1960's, NAVSEA attempted to solve the problem by contracting out all planning and monitoring of ship's force work to a private automated data processing company. NAVSEA quickly determined that this approach became too costly as the price of the services rose past $500,000 for a single ship. NAVSEA continued to seek other solutions. A Navy organization named Planning and Engineering for Repairs and Alterations for Aircraft Carriers (PERA CV) was directed by NAVSEA to develop a computerized management control system for ship's force use in overhaul. At that time, the Air Force had shown considerable success in overhauling their aircraft with the support of a computer based management control system. PERA CV set out to form their system along similar lines and finally developed the Ship's Force Overhaul Management System (SFOMS). Although SFOMS was principally developed for aircraft carriers, the PERA organizations responsible for other types of Navy ships (amphibious ships, cruisers, destroyers, and frigates) modified the system for their own use during the early 1970's. (Moen, 1982)

C. THE FLEET SHIP'S FORCE OVERHAUL MANAGEMENT SYSTEM

In 1976, the CNO directed one standard system be incorporated throughout the Navy, and Fleet SFOMS was born.

NAVSEA describes SFOMS as

> . . .a management system designed to assist ship's force in scheduling and controlling its portion of the overhaul work package. SFOMS revolves around a data file containing ship's workload and manpower data. The ship provides the basic input data and manually maintains or receives back computer sorted reports to provide a better picture of how its manpower resources are being utilized during the overhaul (NAVSEA, p. E-1, 1977).

SFOMS requires that shipboard supervisors plan their work and document the necessary steps to accomplish each job. Using this information received from the work center supervisors, SFOMS compiles man-hour estimates for all jobs and the periods for which the jobs are scheduled to determine the level of workload for each work center. Work center supervisors then update the file weekly to reflect any changes that have occurred.

In overhaul a new shipboard organization emerges to support SFOMS. An overhaul manager is appointed to "schedule and control all ship's force maintenance" and directly reports to the executive officer (NAVSEA, p. II-E-4, 1977). A SFOMS coordinator is named to assist the overhaul manager in directing all "personnel efforts and maintenance activities" (NAVSEA, p. II-E-6, 1977). A division officer is required to submit all new jobs to his department head for approval and then to the SFOMS Coordinator to have the job information entered into the SFOMS data file. Prior to overhaul, division officers were able to use their discretion in seeking department head approval to start a job and

never had to deal with any reporting requirements beyond the department head level. An overhaul manager is tasked to control all ship's force work. This "super" level department head and his special teams are in a position to identify new work, direct others in the accomplishment of that work, and even perform that work themselves.

The overhaul is an important evolution in the life of a ship. It often provides a means to extend a ship's life beyond what had been originally planned. The officers and crew provide the principal resources in that function. SFOMS was developed to provide them with a management control tool to efficiently and effectively accomplish all of the work required for a successful overhaul. However, despite the fact that an obvious need existed for this type of system and that SFOMS theoretically could fill that need, serious problems regarding SFOMS use developed and remain today.

D. PROBLEMS WITH SFOMS

Since its fleet standardization in 1976, SFOMS appeared to have been plagued by problems. Planning Research Corporation (PRC), which is responsible for SFOMS implementation on Pacific Fleet combatants, such as cruisers, destroyers, and frigates, surveys ship's personnel regarding SFOMS at the end of each overhaul. Forty-five percent of all respondents indicated SFOMS did not increase their

effectiveness in determining work and work assignments while only thirty-nine percent felt SFOMS increased their effectiveness. The survey also indicated that at least seventy percent found four of the five SFOMS generated weekly reports not "very beneficial" (Planning and Engineering, pp. 20-26, 1981). One possible explanation of these problems is that SFOMS alters operational lines of authority and information flows in the shipboard management control system resulting in an unfavorable reaction to SFOMS and a lower level of use of SFOMS by ship personnel.

This thesis investigates the impact of SFOMS on authority structures, information reporting structures, and job determinations and assignments. SFOMS' effect on the existing shipboard structures must be understood because the compatibility of the two could determine whether or not SFOMS can fulfill the need for which it was designed. An organization's authority structure is the root of its management control system. Authority, "the power to make decisions which guide the actions of others," is what secures management control within the organization (Simon, p. 125, 1976). Authority provides management the power to make decisions to use their resources efficiently and effectively. An organization cannot have an effective management control system without authority. Information reporting structures, job

determinations, and job assignments are measureable attributes of the authority structure.

This research identified pre-SFOMS lines of authority and information flows on a Navy ship prior to overhaul and the corresponding lines of authority and information flows following the commencement of overhaul. The information was obtained through interviews with the commanding officer (CO) executive officer (XO), weapons and engineering department heads, overhaul manager, SFOMS coordinator, and a division officer, Chief Petty Officer, and a maintenance man from both the engineering and weapons departments of a United States Navy ship. Authority, information flows, and work assignments in pre-SFOMS management control systems are then compared with those actually occurring during SFOMS implementation. This information is then analyzed in terms of theoretical models of authority in management control systems.

The first chapter of this thesis discussed the need for effective management control in overhaul, the history of the development of SFOMS to meet that need, and SFOMS subsequent management control problems. The second chapter discusses the idea of authority within models of management control systems. Chapter three provides the model and its consequent data collected through the interviews and the analysis of that data. The final chapter contains the conclusions and recommendations.

II. THEORY

This chapter explores the relationship between authority and management control. Authority is defined in terms of effectiveness and in terms of the measureable characteristics of communication flows or reporting patterns and work determinations and assignments.

SFOMS is one example of many computer based management control systems in use throughout the United States. The computer, frequently considered a panacea to management's control problems, often fails to live up to expectations (Lucas, 1975). Management control specialists have frequently made the computer the subject of study in an attempt to determine why it does not always enhance management control (Lucas, 1975). The reasons for failure appear varied and wide reaching. Some individuals are discouraged and frightened by the computer and its ability to produce countless numbers of neatly ordered charts, graphs, and tables (Faerbor and Ratliff, 1980). Others cannot make any sense of the print-outs or are overwhelmed by too many computer reports. Some systems' users perceive real or imagined inaccuracies in the data and consequently discredit all of the information produced (Lucas, 1975). Some users' expectations are set unrealistically high only to be dashed wnen the system's design or implementation

fails to meet those expectations (Faerbor and Ratliff, 1980). Many of the studies conclude that the failure of computer based management control systems lies in some aspect of the system's implementation process within the organization (Lucas, 1975; Doktor, Schultz and Sleving, 1975; Keen and Morton, 1978; and Anthony and Herzlinger, 1980). Many management control designers are finding that the implementation process of a computer based control system is exceedingly more complex than the actual design process. Management has learned that even if a system is designed well and is technically proficient, the system just is not successful if it is not used properly. All of this points out that a major reason for systems failure rests not on technical deficiencies within individual computer control systems, but on organizational behavior problems. (Lucas, 1975) These problems may consist of: an organization's resistance to new systems, an unbalanced management system, and a resistance to changes in authority through changes in communication flows and general work responsibilities.

A. RESISTANCE TO CHANGE

A computer supported management control system often threatens the members of an organization through its highly rational and impersonal approach. The system upsets the organization's existing equilibrium and at times appears insensitive to personal relationships and problems. (Keen

and Morton, 1978) It would not be surprising then that even if the members of an organization recognized a need to change existing inadequate procedures or systems, they could very well resist change in preference of those same old inadequate existing routines with which they are more comfortable and familiar (Anthony and Herzlinger, 1980). Another reason for this resistance could be:

> ...a lack of consonance between the distribution of power implied by an information system and the distribution of power existing in the organization...The origins of resistance are found not in the presence or absence of any particular tactic for introducing change, but in the interaction of the substance of the change with its organizational context. (Markus, p. 209, 1981)

The information channels, responsibility structures, and symbols created by the new system can cause user resistance if those channels, structures, or symbols diverge from those already in existence within the organization (Markus, p. 211, 1981). Markus states, "The presence or absence of implementation tactics...cannot produce accepted or successful systems in and of themselves, but they may be instrumental, in a secondary way, in affecting the degree to which a computer based system diverges from the organizational power structure" (Markus, p. 211, 1981). Systems designers must consider the effect changes to power or authority relationships may have on the existing organizational structure. Management must also be able to recognize these changes during the design and implementation stages (Lee and Steinberg, 1980). Often, management overlooks the fact that new control

systems involve changing not only procedures but concepts of authority and control as well within existing management processes (Keen and Morton, 1978). It is from the existing organizational authority relationships that the computer based management control system must ultimately evolve. Clearly, these organizational variables need to be considered during implementation (Lucas, 1975).

B. A FULLY INTEGRATED SYSTEM

The various controls, authority relationships, information flows and computer based information systems found within an organization are interrelated and should be considered as an entire or total management system (Ackoff, 1970). The total management system should be designed to support all aspects of the organization's operations. Each element of the total system must obviously be in balance with any and all elements of that system. (Thomas, 1978) The effectiveness of the total system is reduced if one aspect is working to the detriment of another (Hopwood, 1974). One might compare the balancing of the different elements of a total system to one hundred percent of an individual's efforts. If more attention is needed on one activity, less attention is available for another activity. There must be a trade-off. (Newman, 1975) One element cannot be viewed clearly without understanding its position within the entire system. In addition, an element should not be changed

without recognizing the potential impact the change would have upon the other elements throughout the entire system.

A computer based management control system is one element of the total shipboard management system. The authority relationships, information reporting structures, and other work assignment responsibilities inherent in that computer control system should complement, balance and not work at cross purposes with other elements throughout the total system. Authority is an integral part of each element of the total management system and should be carefully understood to better appreciate its important control function.

C. AUTHORITY WITHIN AN ORGANIZATION

Formal rules, standard procedures, and informal guidelines are used by an organization's management to direct the behavior of subordinate supervisors and employees. Their aim is to lessen the supervisors and employees' need to personally search for methods to solve problems. The directives obviously must be followed if they are to be effective. Management needs to exercise authority to guarantee their rules, procedures and guidelines are followed. This results in greater management control. (Santos, 1978)

1. Structuralist View of Authority

Authority may be viewed from at least two perspectives. The first perspective is known as the structuralist view. This view may be defined as, "the legitimate exercise

of imperative control...the probability that a command with a specific content will be obeyed by a given group," (Santos, p. 244, 1978). Here, authority is a function of the organization. Authority is derived from highly structural and well defined positions within the organization. It is important to point out that the Structuralist view does not vest authority in individuals but in the organizational positions they occupy.

2. Behavioralist View of Authority

The second perspective of authority is the behavioralist view. In this instance authority is a person to person relationship. In order for authority to exist the individual subjected to the authority must understand the order, find the order compatible with the general missions of the organization as well as his own personal interests, and be physically and emotionally able to carry out the order. In this view, authority is finally realized if the individual accepts the order. (Santos, 1978)

3. Effectiveness of Authority

The various definitions of authority differ on whether authority is derived from formal positions or from individuals. In addition, behavioralists claim authority only exists if it is accepted while the structuralists state that acceptance simply is a measure of authority's effectiveness. For the purpose of this research it makes little difference whether authority is derived from the individual

or from his position or whether acceptance is a necessary condition for existence of authority. For purposes of this study it is sufficient to accept that authority does exist within an organization whatever its derivation. The importance of authority to management control rests on its effectivenss, and a discussion whether authority must be accepted to be established or whether acceptance is irrelevant to authority's actual existence will not be pursued here. Authority will be considered as "the power to make decisions to guide the actions of others," (Simon, p. 125, 1976). It is derived from individuals, their abilities, and their positions. Authority is effective if individuals within the organization allow it to be a personal guide to their actions.

An individual may accept authority if he perceives rewards or sanctions, believes it is what people ought to do regardless of their personal beliefs, feels social approval will be gained, or if he feels confident of the competence of the person exercising the authority (Santos, 1978). Acceptance of authority will occur more easily if aims are shared. However, if organizational goals are in dispute, managers must exercise the power of their authority in inducing compliance to orders. (Hopwood, 1974) Within an organization certain posts are accepted by its members as being positions of authority. The president, production manager, and clerical staff supervisor are examples of

positions of authority in a commercial firm. The CO, XO, and department heads, division officers, Chief Petty Officers and work center supervisors are examples on U. S. Navy ships. Their realized degree of authority is naturally enhanced or diminished by their own demonstrated abilities to their juniors as well as seniors and in the way the individuals fulfilling the authority positions interact with other organizational members. This interaction is important to authority. By means of interaction, authority is realized, and this interaction necessitates the use of communication.

D. COMMUNICATION AND INFORMATION FLOW

Communication may be defined as, "A process whereby decisional premises are transmitted from one member of an organization to another," (Simon, p. 154, 1976). Management develops plans, directives and guides to influence the actions of its subordinates. These must then be communicated to the subordinates who decide, whether or not, they will accept the guides. Authority plays an instrumental role in their decision. (Simon, 1976) An organization cannot fruitfully exist without communication as there then would be no way to exercise authority needed to influence the actions of others in order to achieve the organization's goals. (Simon, 1976) Authority is realized to the degree by which the communication is accepted and a desired response

is elicited from a member of the organization. (Santos, 1978) Formal authority may be enough to elicit compliance in the individual receiving the order, but at times the communication must also "reason, plead, and persuade as well as order if it is to be effective," (Simon, p. 164, 1976). Management may also define the authority relationships within an organization by specifying the types of reporting patterns between individuals. (Hopwood, 1974) Communication patterns or information flows are a definite measure of authority within an organization.

1. Communication and the Computer

Computer based management control systems may quite unintentionally change communication patterns and consequently upset existing authority relationships when the systems are implemented in an organization. According to Markus, "By changing who has access to what information or who has control over key data bases, a management information system can alter power bases, disturbing patterns of communication, influence in an organization and consequently alter prestige and status," (Markus, p. 209, 1981). If a computer based control system provides for the distribution of performance reports to managers who before did not have access to that information, those managers may be able to assume different and greater positions of authority by virtue of their added knowledge. Existing authority structures could seriously erode if they are consistently challenged by

new authority relationships emerging from the new control system. (Markus, 1981) The opposite is also true. New systems reporting structures could bypass some individuals thus diminishing their authority and eroding the existing control system.

2. Information Disruptions

Changes to information reporting patterns or existing communication structures can be a cause of great concern to many within an organization. Some individuals feel seniors might be able to exercise greater control over them if the seniors are provided with better information about their efforts. This is not always desirable. (Anthony and Herzlinger, 1980) Subordinates may find themselves changing or doctoring information to present a better picture of their efforts to seniors while fulfilling newly imposed control reporting requirements (Simon, 1978). Other information might only be passed upward if the transmitter believes it will not result in unpleasant consequences, or if he believes the senior would otherwise learn of it through different channels (Simon, 1976). Some organizational members might resist outright new information reporting structures if data is collected, controlled, and furnished by new sources (Anthony and Herzling, 1980). The changes to reporting structures disrupt existing routines and relationships and cloud the organization with uncertainty as to how

these changes will affect authority relationships and consequently the individual himself.

E. WORK DETERMINATION AND ASSIGNMENT RESPONSIBILITIES

Authority, as previously discussed, is effective if it influences the actions of others. Within an organization, this influence is also exercised through the responsibility of determining work projects and issuing subsequent work assignments and directives. Authority can be measured by identifying the individuals responsible for determining work or creating jobs and by assigning others to accomplish that work. When a computer based management control system is implemented, management must take existing relationships into account to ensure that the two complement each other. If not, as with changes to general information flow patterns, existing authority structures could ultimately erode.

F. CONCLUSIONS

Authority is a vital component of an organization's structure and entire management system. It is what guides, directs, and influences each member to sufficiently produce congruent efforts to achieve desired goals. Authority may be derived from the organization's formal, defined positions or from the individuals, and their talents, occupying those positions. To be effective, authority must be accepted by those over whom it is exercised. They in turn must be able

to carry out the orders as well as find the orders compatible with their and the organization's interests. Authority requires communications to exist. An effective means to transmit orders must be present within the organization. At the same time, communication patterns are a measure of authority relationships. Effective authority exists between individuals if one is able to direct the actions of another. In order for this to occur, some type of communication must be present in order to convey the orders or directives. Within an organization, authority may be measured by examining the manner in which the individuals are required to interact or communicate. These communication patterns could include not only reporting work status and completion reports but general information flows such as daily routine reports as well. Authority may also be measured by identifying work determination and assignment responsiblilities within an organization's structure. The individual who is able to determine what work must be accomplished and then is responsible for making the appropriate work assignments is in a position of authority over the individual who must actually perform the work. Changes to authority as a result of new control systems may be resisted if organizational members perceive such changes not to be in their own interests or compatible with their own positions of authority.

Authority plays an important function in an organization's management control system. Authority is the driving

force behind work determinations and assignments, and reporting requirements and other information flows necessary to provide management with the information they require to direct the organization in achieving its goals.

III. THE MODEL AND EMPIRICAL DATA

This chapter provides the framework to which the authority relationships before and after SFOMS implementation are compared and evaluated. The results of the SFOMS interviews conducted on board a United States Navy ship in overhaul are also provided.

A. PRE-SFOMS AUTHORITY STRUCTURES

In order to understand SFOMS' effect on existing pre-overhaul authority structures within the entire shipboard management control system, the pre-SFOMS lines of authority must first be carefully identified. The commanding officer has the ultimate responsibility for the safety, well being and efficiency of his command (OPNAVINST(a), 1979). He is directly assisted by the executive officer. The XO is responsible to the CO for the organization, performance of duty, and good order and discipline of the entire command. (OPNAVINST(a), 1979) A Navy combatant typically has four major departments: engineering, operations, supply, and weapons. Each department is headed by an officer who is responsible for department effectiveness. The department head must plan, direct, and supervise the work and training within his department and must keep the CO informed of the general condition of his department. (OPNAVINST(a), 1979)

The departments are composed of various divisions each fulfilling a unique mission. The weapons department may have a gun division, a missile division, and a deck division. The engineering department might be composed of a boiler division, machinery division, electrical division, and repair division. Divisional responsibility is held by a junior officer who is directly responsible for the proper performance of the duties assigned to his division (OPNAVINST(a), 1979). The division officer is generally assisted by a Chief Petty Officer. Division structures vary but are usually further divided into various work centers responsible for specific tasks. Work center supervisors generally are first or second class petty officers who head maintenance groups responsible for the equipment, machinery, and tasks assigned to the group. (OPNAVINST(a), 1979) Each position lies in the chain of command of vertical authority relationships. Even though numerous collateral duties do exist and are assigned to personnel throughout the ship, thus somewhat clouding reporting relationships, all individuals performing primary functions and duties pertaining to the ship's missions have one immediate supervisor in the chain of command to whom they report and are accountable. Authority relationships based on job assignments throughout the ship are further enhanced by the use of military rank and its inherent authority relationships imposed by law. It is within this framework that ship's work is identified, developed, programmed, performed, and evaluated.

B. PRE-SFOMS MANAGEMENT CONTROL SYSTEMS

Prior to overhaul the Planned Maintenance System (PMS) is the primary method a ship's force uses to accomplish routine maintenance. Maintained by the Chief of Naval Material, PMS covers each piece of equipment and machinery onboard a ship and provides all routine maintenance procedures, the tools required for the maintenance, and the specific levels of technical proficiency needed by the individuals who perform the maintenance. (OPNAVINST(b), 1974)

PMS is supported by ship's force work lists (SFWL) or work center discrepancy logs (WCDL). The actual format varies from ship to ship but invariably contains lists of equipment requiring repairs and identifies the repair parts required which are on order in the supply system. These logs are maintained by the work center supervisor and are periodically reviewed by the CPO, division officer, and department head. The Current Ship's Maintenance Project (CSMP) is a computer provided listing of all work center jobs and required actions which have been deferred for various reasons. Computer inputs are provided by the work center supervisor and approved by the division officer, deparment head, XO, and CO. (OPNAVINST(b), 1974) CSMP inputs are introduced by all ships into a central computer file. The requirements imposed on a work center by all of these systems, logs, lists, and forms do not preclude a work center supervisor, CPO, division officer, or department head

from using unique personal lists detailing work to be accomplished.

C. SFOMS, ANOTHER REQUIREMENT

Once a ship enters overhaul, it is expected to identify, program, and evaluate all work under the SFOMS system in addition to using all previously mentioned systems. Although most of the ship's equipment and machinery is made inactive during overhaul and consequently very little PMS action is required, all administrative requirements remain in force from the other systems and must be accomplished in addition to all SFOMS requirements. (NAVSEA, 1977)

D. THE METHOD

SFOMS' effect on existing authority structures was determined by identifying the lines of authority on board a ship before and after a SFOMS implementation. The lines of authority are manifested through the relationships between individuals. These relationships surround work identification, programming, and assignments. The lines of authority are also revealed through the job status reporting requirements imposed on lower level managers by seniors. The actual direction and flow these reports take are indicative of the established lines of authority. The crew of a single ship was used for the purposes of this research to determine these authority relationships.

E. THE SHIP

Authority structures were identified by asking questions of individuals on a ship which had entered overhaul three weeks before the interviews were conducted. Unfortunately, scheduling requirements prevented a visit to the ship before overhaul commenced to supplement a visit following SFOMS implementation. Admittedly information based on individuals' recollections of how authority structures existed a month earlier has its limitations. Regardless, the results of this initial research should still provide a useful insight into the problem of SFOMS' effect on authority. Neither the identity of the ship nor the names of the individual participants will be disclosed. The ship was a destroyer type combatant. The individuals interviewed included the CO, XO, weapons and engineering department heads, a division officer, CPO, and a work center supervisor/maintenance man from both the weapons and engineering departments, the overhaul manager, and the SFOMS coordinator.

The ship involved had a normal operational crew in excess of three hundred men, although at the time of the interviews manning levels had dropped to less than two hundred because of leave, temporary assignments, and transfers. A questionnaire was developed specifically for each position within the ship's organizational hierarchy. The questions were designed to identify authority relationships before the SFOMS implementation and the same questions were used to

identify the relationships following the SFOMS implementation.

F. THE INTERVIEW QUESTIONNAIRE

A set of questions was developed to identify the authority relationships existing throughout the ship's chain of command from the level of the work center supervisor up to the CO. Exhibit 1 displays the basic core of questions in which lines of authority, information flows and reporting requirements, and work determinations and assignments were identified for each position. Each question was asked twice (as demonstrated in Exhibit 1, questions A.1a and A.1b) to determine the authority relations existing before and after the SFOMS implementation.

The individuals interviewed were asked to provide details about specific jobs, both routine and non-routine in forming their answers. The questions were pointedly asked along the lines of "what did you do then?" and "who told you to do that for that particular job?" This was done to minimize an individual's tendency to relate what should have happened rather than what actually happened. The list of questions was tailored to each level of the chain of command, and follow-up questions were often asked in order to gain a better understanding of the respondents' thoughts. The following is a discussion of the purpose of the questioning for each level of the chain of command.

Exhibit 1

A. Work determinations and assignments.

1a. Before you entered overhaul did your work center have a plan of work to be accomplished each week?

1b. This week in overhaul, did your work center have a plan of work to be accomplished?

2. Describe the plan.

3. How was it determined?

4. Who participated in its determination?

5. Did you personally keep any records?

6. Describe them.

7. On a given day, how did you know what work to do?

8. Who gave you your assignment?

9. In what form was your assignment given?

10. Did you ever decide or suggest what work you would do?

11. What procedures are involved in order to do that work?

12. Do you make assignments to subordinates?

13. What form do you use to make the assignment?

14. If you initiated or suggested a job, how did you go about getting it started?

15. Whose approval was received?

16. If jobs were ever disapproved, describe the situation surrounding the disapproval.

B. Information flows and reporting requirements.

1. As a job progressed, what happened?

2. As a day ended and you were not done, what did you do?

3. Did you tell anyone of the job status at any time?

4. If you had any questions, who did you ask?

5. Were they answered?

6. When you were given the job what information was provided and who provided it?

7. When you were given the job, what reporting requirements were placed on you and by whom?

C. General authority relationships.

1. How did you know when a job was finished?

2. When a job was finished, what did you do?

3. Did anyone inspect or approve your work?

4. Did you inspect or approve a subordinate's work?

5. After you completed a job, did anyone above you in the chain of command tell you the job was not finished?

6. If that occurred describe the situation and resulting actions.

7. Did any individuals personally visit your work area to monitor the work in progress? Who?

8. Were you ever required to perform some action related to your work by someone who was not directly in your chain of command?

9. Describe the situation.

10. How was the conflict resolved and by whom was it resolved?

11. Did you ever have a job that conflicted with the efforts of other in your work center/division?

12. Describe the situation and how it was resolved.

1. Work Center Supervisor

The questions under the heading of work determinations and assignments were used to identify the work planning processes within a work center and the key participants in those processes. The ability to identify jobs, give work instructions, assignments, and final job start approval or disapproval are characteristics of the job responsibilities of personnel in authority positions. The questions grouped under information flows and reporting requirements identified individuals who were able to specify particular job procedures as well as require work status reports. The general authority relations questioning offered a further indication of whom the maintenance men/work center supervisors saw as being in positions of authority responsible for inspecting completed jobs, and giving job completion approval or disapproval. These questions also provided a means to determine who were able to give orders which conflicted with already given assignments. The general authority relation questions also provided the information to determine personnel who had the authority to resolve these conflicts in addition to resolving job coordination problems. At times, additional questions requiring responses describing general impressions or beliefs were used to supplement the basic core of questions.

2. Chief Petty Officer/Division Officer

The questions used to determine the authority relations at this level of the shipboard chain of command were similar to the questions designed for the work center supervisor/maintenance man. They were modified along the lines from "who gave you work to do?" to "who gave you work for your subordinate personnel to do?" Again the questions were asked twice to determine the authority relationships existing before and after SFOMS implementation. An example of pre-SFOMS work determination and assignments questions follow:

Did your division have a plan of work to be accomplished each week prior to overhaul?

Describe the plan.

How was it determined?

Who participated in its determination?

Here again the CPOs and division officers were asked to provide details about specific jobs in response to each question. The work determination and assignment questions identified the work planning process and participants involved at the divisional level encompassing the work centers. The questions were also used to determine who gave job start approval and disapproval at that level and who made actual daily work assignments. Questions grouped under the heading of information flows and reporting requirements helped to determine the CPO/division officer's positions in

the work status information reporting network. The reporting requirements they placed on their subordinates as well as the requirements others placed on them would be indicative of the authority relationships within the ship's management structure. The question asking "what information guidelines were given you along with job assignments for your division?" was used to determine the amount of job authority or discretion, a CPO/division officer retained even when the job was assigned by a different level of authority. The general authority relation questions were developed to identify the personnel having the authority to approve jobs as being completed, and to identify the processes used for job completion approval. These questions were also used to determine the personnel involved in job scheduling conflicts and the personnel who subsequently resolved the conflicts.

3. Department Heads/XO/CO

The questions for the department heads were similar to those for the CPO/division officer except the questions were framed from a higher organizational level. The XO was interviewed to determine his participation in the conduct of work planning and assignment, and monitoring progress. His participation in conflict resolutions was also identified. The CO provided a very general description of the management framework within his command and SFOMS' position within that framework. Each question was asked twice to identify the

authority relationships before and after the SFOMS implementation. An example of the general authority relation questions asked of the department heads follows:

> Following overhaul commencement this week, did your department ever have a job that conflicted with the work of other departments?
>
> Describe the situation.

An example of a general authority relations question asked of the XO is:

> Following overhaul commencement, this week have there been any scheduling conflicts between divisions or departments? At what level? Who resolved them?

4. SFOMS Coordinator and Overhaul Manager

The questions asked the SFOMS coordinator and overhaul manager were developed to identify SFOMS reporting procedures and to determine the organizational structure as a result of SFOMS.

G. THE INTERVIEW RESULTS

As the basic core of questions was asked to each succeeding level of the chain of command, authority relationships revealed at the previous level were either validated or refuted. Each individual willingly participated and answered all questions openly. All interviews were conducted during a one week period in the Spring of 1982.

The authority relationships identified as a result of the interviews are presented in terms of 1) the effect on work determination and assignments; 2) information flows and

reporting requirements; and, 3) general authority relationships.

1. Effect on Work Determination and Assignments

Prior to overhaul, in both engineering and weapons departments, work projects generally were programmed and assigned at the lowest supervisory level in the division, typically by the work center supervisor. PMS quarterly programming was performed by the work center supervisor. He also made the actual daily PMS job assignments. The division's CPO, the division officer and department head reviewed and approved the quarterly programmed PMS schedule, and the division officer would approve the daily assignments. Approximately ninety percent of the non-routine work was originated at the work center level and all were recorded in the SFWL, the CSMP, or lists unique to the work centers. Work center supervisors, with the assistance of the division's CPO would make daily non-routine work assignments. The remaining ten percent of the non-routine items were originated at the division officer or department head level although actual assignments to accomplish the work continued to be made by the work center supervisor. Non-routine jobs were brought to the division officer level or above for approval when work involved a repair to a weapon system or the engineering plant which affected the ship's ability to perform its missions.

Work center supervisors were allowed latitude as to whether to seek non-routine job approval from their division officers or department heads. Non-routine jobs originating at the XO/CO level or at off-ship industrial activities requiring some type of response by a work center were passed through the chain of command down to the appropriate work center level for action. Job start disapproval occurred at the division officer level or department head level. Disapproval was due to conflicts with the ship's operational schedule, and the jobs had to be postponed until later.

Following overhaul commencement and SFOMS implementation, work center supervisors continued to identify the majority of work for their work centers to accomplish. Divisional CPO's assisted in this task with division officers and department heads at times providing inputs. PMS, on equipment not declared inactive, continued to be performed as it had been prior to overhaul. All other routine and non-routine jobs were documented for SFOMS at the work center supervisory level. All new SFOMS jobs and weekly updates were sent to the SFOMS coordinator via the divisional CPO, division officer and department head. All jobs were routed through the CPO, division officer and department head for their approval in order to get the job into the SFOMS data file.

Work center supervisors could no longer use their discretion in seeking upper level approval for job starts on some work. All jobs had to be routed through the department head level if they were to be placed into the SFOMS system. However, work center supervisors claimed no job had ever been disapproved and the division officers and department heads seemed more concerned with the report format rather than the actual content of the job. The division officers and department heads verified this by stating that although they were interested in the content of some major jobs, they were more concerned with whether the SFOMS job input forms and updates were properly completed. The officers questioned said that in most cases the work center supervisors and CPO's were fully capable to identify and approve the work which needed to be accomplished. Work center supervisors were also asked whether the SFOMS coordinator appeared to be approving or disapproving their work. Again, they said he was concerned with format and man-hour scheduling and not job content. The SFOMS coordinator confirmed this by stating he felt he could better assist the work centers by helping them plan the timing of their work to prevent scheduling overload conditions.

2. Pre-SFOMS Information Access

Prior to overhaul, the degree to which division officers, department heads, the XO, and CO were kept informed of the status of all work in progress narrowed at

each succeeding level of the chain of command. Work center supervisors knew of all work in progress by their maintenance men. The work center supervisors tried to keep their CPO's fairly well informed of their work status. It was the CPO's who performed the first observed level of information filtering by bringing to the attention of their division officer only basic work progress information and some details on major jobs in progress. Division officers continued the screening process to their department heads and the department heads to the XO and CO. Information of concern to the engineering plant or the weapons systems flowed unimpeded to the XO/CO level. Information of interest to the CO and XO was provided upon request. The engineering officer had imposed greater information reporting requirements upon his division officers than had the weapons officer because of the importance of the engineering plant to all of the ship's missions.

In addition, various formal means existed to provide information to the XO/CO level. Eight o'clock reports provided information concerning equipment experiencing major casualties or failures. The Management Team and the Planning Board for Training which were composed of the department heads and other key individuals designated by the XO would discuss present and forthcoming events and would resolve any scheduling conflicts. However even given the formal and informal means of requesting and providing

information throughout the chain of command, information was screened and filtered as it flowed upward.

Work center supervisors were also asked how often they observed their CPO, division officer, department head, XO and CO collecting their own work status information by actual physical inspection. CPO's were seen within the work center work space on a very regular basis several times a day. The two division officers were seen within the work spaces about once a day. Department heads were seen less frequently, once or twice a week, as were the XO and CO. In the engineering department, officers stood watches within major work spaces, the fire rooms and engine rooms, and were able to observe any work being conducted concurrently with their watches. However, when not on watch the engineering division officer and department head visited the work spaces at the same frequency as their counterparts in the weapons department. When the division officers and department heads were asked how often they visited work centers to monitor work in progress their answers tended to confirm the responses of the work center supervisors. Althougn, the officers admitted to slightly higher visit rates, one or two visits more per week, than attested by their enlisted men.

3. SFOMS' Widened Information Access

With the implementation of SFOMS, more detailed job information and scheduling information were available to more levels within the chain of command. This increased

some officers' desire to receive more information. One work center supervisor stated:

> They want to know what jobs we have scheduled, how we are doing on them, the update, what the status is, if our materials have been received, and the status on those...They want to see that everything is running smooth, that jobs are being done on time, man-hours are being expended, and when jobs aren't being completed that it's being documented.

Even though similar perceptions of more information being desired by superiors were held by other interviewees, the actual occurrence of individuals desiring greater access to work information or even using the greater levels of information that were currently available as a result of SFOMS was not consistently found throughout the chain of command.

The CO and XO continued to receive work progress information through the formal and informal channels as they nad prior to overhaul. However, in addition, the SFOMS system provided them man-hour usage and man-hour programmed scheduling reports. The CO and XO stated tnat they used those reports to look for patterns indicative of scheduling problems or inefficient man-hour usage. The XO stated that if he uncovered such a problem he would bring it to the responsible department head's attention for immediate resolution. One department head said:

> The CO and XO use it to ask questions. The CO is heavy on man-hour utilization and uses it (the SFOMS report) to ask questions about different jobs.

Another officer said:

> The CO and XO are interested in what the ship's force is doing by looking at what work they have documented (through SFOMS). They are interested in what slack we have, and can we identify new work?

Throughout the chain of command, the individuals interviewed believed the CO and XO to have been using SFOMS in this manner.

The department heads interviewed used their SFOMS reports to solely identify an inefficient programming of man-hours and other possible problem areas. This actual practice differed from perceptions held by the department heads' subordinates who believed the two department heads to have been using SFOMS more extensively to monitor all work.

The senior managers' increased ability to monitor the work of their juniors, as a result of SFOMS, caused some lower level supervisors to view SFOMS as a negative management weapon, and subsequently, SFOMS usage was affected.

> The first SFOMS reports...were used as a weapon I suppose. This was not well received.
>
> Engineering Department Head

> The SFOMS reports tell everybody what we need to do. I guess it's a two edged sword. The reports show we aren't doing something and we get hammered for it...
>
> Engineering Division Officer

> To me it doesn't seem feasible...this week I had to defer 5000 man hours in one space...just to get the negative numbers off the SFOMS reports so we wouldn't get hammered about it.
>
> Engineering CPO

One supervisor stated that he had changed the number of actual man-hours scheduled for his work center to a lower number. Although the lower number was not realistic, the supervisor said it was more acceptable to his seniors and he "wouldn't get hammered about it."

Another example of numbers being changed because of a senior's increased ability to monitor work was revealed by the SFOMS coordinator. He said that he had encountered several situations where work center supervisors had inflated their man-hour work loads to present an appearance that their work centers were fully programmed, when in actuality they were not. This was done to prevent a department head from reading in his SFOMS report that idle man power resources existed in those work centers. According to the SFOMS coordinator, the work center supervisors who inflated their work load on the SFOMS report apparently thought the seniors would direct the idle workers to centers where they were needed.

Division officers and CPO's continued to be informed of work progress as they had prior to overhaul. The SFOMS reporting system was not their primary source of information.

4. Effect of SFOMS Organizational Structure

A SFOMS organization is peculiar to ships in overhaul. A SFOMS organization naturally does not exist outside of overhaul. The creation of authority positions to support the SFOMS organization once a ship enters overhaul would

obviously be a change to pre-overhaul shipboard authority structures. On the ship where the interviews were conducted, not one of the interview participants said that the overhaul manager or SFOMS coordinator had invaded any of their own personal areas of authority. Some respondents stated that at times these two individuals and their special action teams provided support and expertise to areas simply where it was needed. The SFOMS coordinator and overhaul manager echoed this sentiment by stating that they were to provide management assistance to the divisions and not to usurp the authority behind that management. Some conflicts did occur between the divisions and the SFOMS organization but they were all admitted to be minor in nature and were resolved. The respondents' only criticism of the SFOMS organization was that it required too many personnel to support it thus denying divisions the use of many of their personnel. However, this was not viewed so much as losing authority over subordinates as losing the capability of having sufficient man power resources available to perform necessary work.

IV. CONCLUSIONS AND RECOMMENDATIONS

This chapter provides the conclusions drawn from the interviews and the subsequent recommendations for future SFOMS use.

The results of the interviews offer an interesting mix of perspectives of SFOMS' effect on the authority structures within the entire shipboard management system. Perspectives of SFOMS varied throughout the chain of command. Three general conclusions can be drawn, however, which are supported by the statements made by the interview participants at each level of the chain of command. The conclusions are:

Work Determination and Assignments

The SFOMS system and its designed procedures for planning, programming and assigning work did not change the authority relationships for planning, programming, and assigning work in existence prior to overhaul;

Information Flows and Reporting Requirements

The SFOMS reporting system gave a greater access of information throughout the chain of command subsequently affecting authority relationships as contrasted to the reporting systems and authority relationships prior to the SFOMS implementation. In two cases actual SFOMS usage was affected by the change in authority due to SFOMS widening of information access channels throughout the chain of command; and,

Effects of SFOMS' Organizational Structure

SFOMS new organizational structure and its corresponding authority relationships did not seriously impact on authority structures existing prior to overhaul.

A. WORK DETERMINATION AND ASSIGNMENTS

Under SFOMS, work center supervisors continued to make about ninety percent of the work determinations and assignments. They were directly assisted by their CPO's. The work center supervisors received direction from their division officers and department heads on the remaining jobs. Although the SFOMS system contained a requirement for division officer and department head approval for all new jobs and weekly updates, at the time of the interviews no job had ever been disapproved because of its content. Job input forms were returned if they were not filled out clearly or properly, or if the jobs created scheduling problems. After the problems were corrected, the forms were returned to the SFOMS coordinator, and the job information was entered into the SFOMS data file without any further incidents. The authority relationships based on work identification, approval and assignment did not appear to have changed as a result of the SFOMS implementation.

B. INFORMATION FLOWS AND REPORTING REQUIREMENTS

The purpose of this area of questioning was to reveal SFOMS' change in access to job information and the corresponding change in authority relationships. The CO and XO's authority was enhanced as they were better able to monitor and subsequently control ship's force jobs. The remaining officers and enlisted personnel understood the

SFOMS provision allowing for greater information access to the CO and XO, and consequently they said their perceptions of the CO and XO's authority increased. Similarly, even though an officer did not use SFOMS very heavily as a management tool, if a subordinate said that his perception was that the senior did greatly rely on the information SFOMS provided, the subordinate said he felt the officer's authority had indeed increased. The result of this stated perception of increased authority resulted in work center supervisors and CPO's paying close attention to their SFOMS reports to prevent "getting hammered." All but one of the work center supervisors and CPO's who did pay close attention to their reports said they found SFOMS to be a useful management tool.

One supervisor however, said that his seniors' increased ability to monitor his work through SFOMS was highly undesirable. He said he had engineered numbers for his SFOMS report that were useless to him as a management aid. However, they were nevertheless numbers he said he thought his department head wanted to see because they made a good report. The SFOMS coordinator also revealed that he had uncovered instances where work center supervisors had inflated their upcoming man-hour loads with inaccurate job estimates. They did this to present a picture that their work centers were fully programmed and could not spare any man power resources to other work centers that were in need of additional personnel.

This research demonstrated that SFOMS could increase a seniors' ability to monitor work. Whether or not the seniors actually used SFOMS in this manner, the result was lower level supervisors claiming that the seniors' authority was enhanced. This resulted in work center supervisors in paying closer attention to their work. In the case of the supervisor who engineered numbers and in the example provided by the SFOMS coordinator where supervisors inflated their job estimates, this "paying closer attention" was in reality a dysfunctional effect. Work center supervisors improperly used SFOMS by engineering numbers to prevent a senior from gaining greater control over them. These were the only situations uncovered during the course of the interviews where it was shown that proper SFOMS usage was affected adversely because of the changes to shipboard authority structures due to the information flow changes.

C. EFFECTS OF SFOMS ORGANIZATIONAL STRUCTURE

The interviews did not reveal instances where the newly created SFOMS organization adversely affected the existing authority structures throughout the ship. The positions of overhaul manager and SFOMS coordinator were not viewed by any of the respondents as having assumed any other individual's responsibilitites or authority. Most interviewers said the overhaul manager and SFOMS coordinator assumed responsibilities and performed functions unique to overhaul

which would not have been needed outside of the shipyard. The work center supervisors and division officers who were questioned stated the SFOMS organization simply helped them to better perform their work. Therefore, no evidence was discovered indicating the SFOMS organization had an adverse impact on the existing authority structures.

D. RECOMMENDATIONS

The crew of a ship in overhaul is confronted with the problem of how to control a challenging level of work, a level seldom seen outside of the shipyard. Identifying, planning, scheduling, assigning, monitoring, and evaluating all of the work which must be done, before the ship can again be considered as operational, is a tremendous task that the officers and crew must perform. To help shipboard management better meet this challenge, the CNO directed the development of Fleet SFOMS. Yet, at times the solution to the problem has appeared to compound the problem. SFOMS or any similar type of computer supported management control system is not used by U. S. Navy ship crews outside of overhaul. As a result, when a snip enters overhaul, its crew is told that they must change their managing techniques as their previous methods of managing are no longer sufficient to meet the challenges of overhaul. This is a problem often encountered when a new management control system is introduced into an organization, and frequently is the reason why the new system is doomed to failure.

SFOMS was designed to be just one part of the entire management system and consequently must remain in balance with the other components of the system. The question as to whether SFOMS causes an imbalance within a ship's authority structure was addressed in this research. Some evidence was encountered indicating that SFOMS did increase some individuals' authority by increasing their access to information concerning work progress. This resulted in some subordinate personnel stating that they believed SFOMS was a management weapon permitting superiors greater control over their actions. Beside causing ill feelings toward SFOMS it also, in one known instance, caused the doctoring of a SFOMS report which originally indicated man-hour overload conditions and scheduling problems to one which displayed all work being within the immediate supervisor's control. Also, the SFOMS Coordinator revealed that some supervisors had falsely increased their man-hours scheduled. This was done to prevent a senior supervisor from reading their SFOMS report and discovering the existence of idle workers within a work center and then reallocating the idle workers to other centers where they were needed. These occurrences of improper SFOMS usage as a result of SFOMS widened access of work progress information and the subsequent increased authority probably might not have happened if the senior managers did not have access to information concerning man-hour programming. Both of the examples demonstrate that an

attempt to gain greater control over an organization by management can often result in less control. This has been demonstrated in previous research. (Dalton and Lawrence, 1971) SFOMS did appear to affect authority structures aboard ship by changing information access finally resulting in improper SFOMS usage.

1. Suggested Further Research

In addition to authority, other elements of SFOMS could unbalance the management system such as the increased administrative workload. This area, as well as others including the adequacy of SFOMS training, the perceived need for a "SFOMS" system by the ship's crew and the degree of top management support for the program could have a potential impact on the proper use of the system. Unrealistic expectations held by potential SFOMS users, the fear of the computer, and a potential user's general resistance to change could also have an adverse impact on proper SFOMS usage. All of these areas are worthy of further research because of their importance to the implementation of a control system.

The evidence uncovered during this research does not necessarily indicate that SFOMS is the wrong system to meet the management control challenges of overhaul, but does indicate the need for implementors of this and similar types of systems to be aware of the many factors governing a successful implementation of new controls within an

organization. To decrease the access to information SFOMS provides, might solve the authority problems addressed in this research but would also decrease management's control which is what SFOMS was designed to enhance. Rather, users of SFOMS should be made aware of the potential problems of authority imbalances which could erupt when information access is widened or narrowed, within a management system. Another longer range solution to this type of problem would be the institution of one computer supported management control system for shipboard management's use in and out of overhaul. According to the PRC SFOMS Project Manager, NAVSEA is investigating that option with the development of the Organization Maintenance Management System (OMMS). This system would provide ships' managers with an onboard computer supported capability to control ships force work all of the time. (Campbell, 1982) The use of a standard shipboard management control system, "year round, every year, wherever you are," could ultimately pave the way for the resolution of many of the SFOMS use problems being experienced today. As this system, or any system, is implemented, it should be allowed to evolve into a dynamic component of the entire shipboard management system. The designers, the implementors, and most importantly, the users should be aware of the many behavioral organizational factors which have the potential of disrupting their efforts. Acknowledging the existence of these factors

probably will not automatically ensure success in the implementation of management controls, but would provide a basis upon which a successful management control system could be designed, implemented, and properly used.

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